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EXAMINER				
MA, JAMESON Q				
ART UNIT		PAPER NUMBER		
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/589,653

**Applicant(s)**

KOSER, HUR

**Examiner**

JAMESON Q. MA

**Art Unit**

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 May 2009.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-38 is/are pending in the application.  
4a) Of the above claim(s) 16-38 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-15 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 16 August 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO/5508)  
Paper No(s)/Mail Date 20060816  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Inventor's Patent Application  
6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election of group I in the reply filed on 5/18/2009 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Claims 16-38 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected group, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 5/18/2009.
3. Applicant's arguments regarding the species restriction are persuasive. The species restriction between species I-A and I-B has been withdrawn.
4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the mechanical microvalve or air valve of claim 8 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate

changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Objections***

5. Claim 8 is objected to because of the following informalities: the wording of claim 8 can be interpreted that the valves are used in a process of sealing the trench rather than as being specific parts of the claimed device. If it is the intention of applicant to have these structural features included in the device, the features should be positively recited in the claim. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The recitation "much larger" in claim 3 renders the claim indefinite.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-7 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by O'Connor et al (US 2002/0185183).

Regarding claim 1, O'Connor discloses a microfluidic device (see Figs. 5A-B) comprising:

A flow channel (1031) and at least one microfluidic trench (1037) arranged beneath and substantially perpendicular to the flow channel.

The instant specification describes a means for measuring the response of a living moiety to the chemotactic agent as simply observing and recording the reaction to the agent through a microscope, which is viewed as intended use of the claimed apparatus.

The chemotactic agent and living moieties are viewed as materials worked on. It is noted that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, it has been held that process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating

the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim.”

For claim 3, it is apparent from fig. 5A that the microfluidic trench (1037) has a length dimension that is much larger than its dimensions for width and depth.

For claim 4, the living moiety is treated as a material worked on.

For claim 5, the microfluidic trench disclosed by O'Connor is viewed as fully capable of allowing for full motility of a living moiety within the trench.

For claims 6-7 and 9, O'Connor discloses that vias connect the flow channel (1031) and trenches (1037). These vias are viewed as means for trapping the living moiety in the trench and are additionally viewed as a roof structure. An additional means for trapping is disclosed in [0065], which describes that the device was re-laminated (viewed as sealing).

### ***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
12. Claims 13-15 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over O'Connor et al (US 2002/0185183).

For claim 13, it appears that the recitation is directed toward intended use of the claimed apparatus. In that instance, the claim is anticipated by O'Connor. If the recitation specifically requires an additional microfluidic device, O'Connor discloses that in the prior art, separate or off-line pumping mechanisms are contemplated (see [0005]). It would have been obvious to one of ordinary skill in the art to use a separate pumping mechanism to provide reagents or inputs to the microfluidic device of O'Connor to provide an accurate and controlled means of reagent input.

This pumping system is seen to meet the limitations recited in claim 15.

For claim 14, as currently recited, the claim appears to be directed to intended use of the claimed device. If the recitation requires specific structure, O'Connor discloses that conventional tools contain electrodes to induce electrokinetic flow to perform electrophoretic separations (see [0007]). It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate electrodes into the microfluidic device of O'Connor in order to provide the capability to perform electrophoretic separations.

13. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over O'Connor et al (US 2002/0185183).

Regarding claim 8, O'Connor discloses all of the claim limitations as set forth above. The reference does not explicitly disclose that each end of the device contains

a mechanical microvalve or air valve. O'Connor discloses that the disclosed device is intended to perform a multitude of chemical and biological analysis including liquid chromatography (see [0002] and [0064]). O'Connor additionally discloses that in the prior art, miniature pumps and valves can be constructed to be integral within microfluidic devices (see [0005]). It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate miniature valves in the device of O'Connor because doing so would have resulted in nothing more than combining prior art elements according to known methods to yield predictable results. Additionally, the use of microvalves would allow for better fluid control into and out of the device/trenches.

14. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over O'Connor et al (US 2002/0185183) in view of Pezzuto et al. (US 6,418,968).

Regarding claims 10-12, O'Connor discloses all of the claim limitations as set forth above. The reference does not explicitly disclose that a roof structure comprises a patterned surface or is a semi-permeable membrane.

Pezzuto discloses a very similar device to that of O'Connor. Pezzuto further discloses an improvement wherein the microfluidic device has built-in means for controlling fluid flow in the form of porous materials. In use, when fluid encounters these regions, fluid flow will be inhibited until sufficient pressure is provided for the fluid to overcome the impedance (see C1/L9-17). Pezzuto further discloses that these porous materials (which are viewed as a patterned substrate capable of trapping a living moiety and as a roof structure) can be a polyethylene porous membrane (see C3/L51-60). It would have been obvious to one of ordinary skill in the art at the time of invention



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to provide a polyethylene membrane in the device of O'Connor in order to allow for precise fluid control as taught by Pezzuto.

***Conclusion***

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMESON Q. MA whose telephone number is (571)270-7063. The examiner can normally be reached on M-R 8:30 AM - 7:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571)272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JM

/Jill Warden/  
Supervisory Patent Examiner, Art Unit 1797

July 28, 2009